Brief Overview of Environmental Impacts from Commercial Vessels

Or

The Results of Highways and Small Cities on the Ocean

Same Old Problems, Different Location

- Many impacts are similar to land based facilities.
- Mobility, size constraints, mission and a couple of issues are unique.
- Industry has been regulated very differently than similar land-based facilities.

Environmental Impacts

Similar

- Sewage
- Gray Water
- Oil Spills
- Air Emissions
- Solid Waste
- Hazardous Waste

Unique

- Ballast Water
- Invasive Species
- Oil Spills

Impacts of Sewage

- Black waste contains huge levels of pathogens.
- The untreated waste from 2 people on 1 boat contribute the same amount of bacteria as the treated municipal wastewater from a town of 10,000 people.
- Organic matter depletes oxygen in the waterbody.
- Nutrients contribute to the growth of algae which can reduce clarity, affect habitat, poison shellfish, and further reduce oxygen levels.

Sewage Comparison

Land-Side

- Regulated since CWA in 1974 via licenses and permits.
- All wastewater combined.
- Best Practicable Treatment.
- Primary, secondary, tertiary treatment.
- Most Maine discharges have secondary treatment, BOD & TSS limited to avg. of 30 mg/l.
- Bacteria limits in coastal waters avg. 15 col/100ml.

Ship-Side

- Regulated since 1976 via standards, no permitting.
- Black waste separated from gray waste.
- MSD standards set by CG equivalent to BPT.
- Black waste treated to TSS levels of 150 mg/l.
- Bacteria limited to 200 col/100ml

Sewage Comparison Cont..

Land-Side

- Effluent Monitoring and Reporting
- Other license requirements: by-pass, spills, operators, receiving WQ, toxicity.
- Regular inspections by regulating entity.

Ship-Side

- No effluent monitoring
- No additional requirements

Graywater

- Similar contaminants and impacts to sewage.
- Also may contain wastewater from other processes.
- Can have similar levels of bacteria, high levels of solids, generally lower levels of nitrogen, but potentially high levels of phosphorous.
- Cleaning chemicals can significantly contaminate graywater.
- No treatment on ships required.

Graywater Comparison

Land-side

- Managed with black waste most of the time.
- Subject to BPT, and effluent standards.

Ship-side

- No treatment required.
- Normally separated from black waste.
- Normally not connected to holding tanks.

Oil Spills

- Small oil spills can result in localized suffocation, and/or toxicity depending on compound.
- Long term potential carcinogenic and habitat impacts.
- Aesthetic impacts.
- Impacts from large spills well documented

Oil Spill Comparison

Land-side

- Normally easy to find the source.
- Can usually be contained and remediated.
- Normally have a buffer before a waterbody.
- Notification requirements, penalties and clan up costs applied.

Ship-side

- Sometimes difficult to find the source.
- Difficult to contain and remediate.
- Normally goes directly into waterbody.
- Notification requirements, penalties and clan up costs applied.

Air Emissions

- Large diesel engines emit NOx, SOx, and particulates.
- Contributors to ground level ozone and smog.
- Can cause respiratory distress, eye and nose irritation, heart stress, and asthmatic reactions.
- Aesthetic impacts.

Air Emission Comparison

Land-side

- Source is usually stationary.
- Mobile sources burn lighter and cleaner fuel.
- Regulated through a licensing process over a certain size.
- Emission controls depending on size.
- Some mobile sources have to meet engine requirements.

Ship-side

- Source is mobile.
- Burns heavy, often high sulfur, Bunker C fuel.
- Not regulated.
- Few if any emission controls on many ships.
- Add on controls may be difficult to fit into engine room.
- No engine standards on older vessels.
- New Category IIIs have engine standards.

Solid Waste

- Generated by everybody.
- Consists of metals, plastics, paper, glass and organics mostly from packaging and clean up. Can contain pathogens.
- Metals, glass and plastics persistent in the environment.
- Can cause entanglement, choking, strangulation and stress to marine animals.
- Aesthetic issues.

Solid Waste Comparison

Land-side

- Town or regional transfer stations manage waste.
- Recycling facilities vary by transfer station,
- Recycling stands at 30-60% of waste stream.
- Littering illegal in most locations, enforcement is scarce.

Ship-side

- Must be incinerated or stored until port.
- Some ships recycle certain wastes and hold them until port.
- Littering also illegal but enforcement is even scarcer.

Hazardous Waste

- Generated by a few processes.
- Waste can be flammable, explosive, reactive, or toxic.
- Often immediate and persistent toxicity.
- Metals can accumulate in sediments and be re-circulated.

Hazardous Waste Comparison

Land-side

- Storage, labeling, record keeping the same.
- Spills normally can be contained and remediated.

Ship-side

- Must be stored until port.
- Spills difficult to impossible to contain and remediate.

Ballast Water

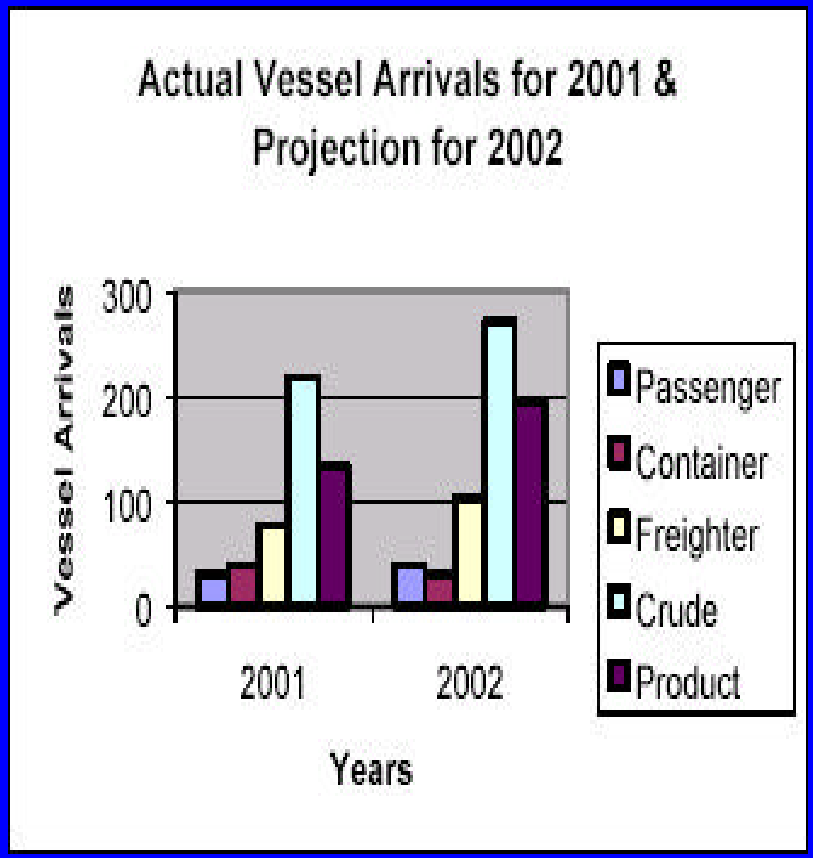
- Unique issue to commercial boat traffic.
- Some tanks are shared with other uses causing contamination.
- Can be contaminated with oil, bacteria, solids, or non-native species. Impacts are similar to those identified before.
- Water is taken on in one location and dropped in another bringing contamination along.
- Coast Guard has established voluntary program to encourage ships to change ballast water offshore where the impact may be less.
- Might not be a huge issue for Maine because most ships come in loaded.

Invasive or Non-Native Species

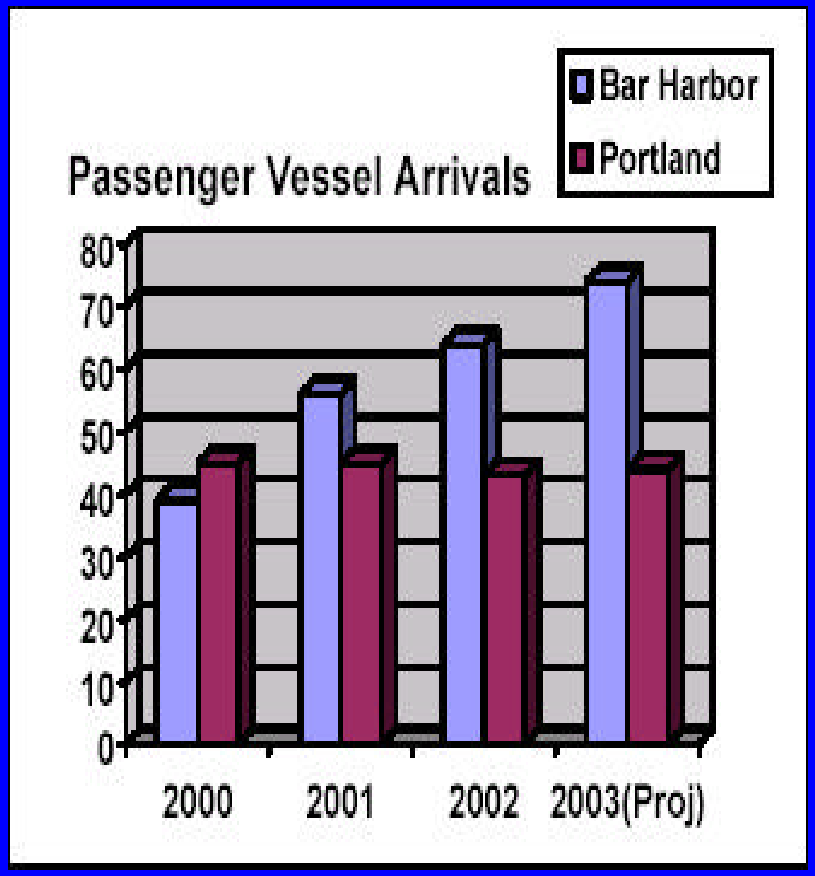
- Unique to any kind of shipping.
- Can come in through ballast water, bilgewater or “hitch-hikers” on the hull.
- Some can out-compete or prey on native species, upsetting food chains and the ecosystem.
- Some can cause nuisance problems by fouling beaches and shorelines, intake or outfall pipes.

Commercial Vessel Traffic is Increasing

- Except for container ships, all shipping traffic increasing.
- Multi-Modal transportation is being pushed on many levels.



Passenger Vessel Traffic is Increasing



- Passenger traffic increasing rapidly.
- Diverse types of passenger vessels.
- Diverse age of equipment.

So What Does This Mean to Maine?

- We can expect to experience some environmental impacts from commercial vessels.
- The type and magnitude of those impacts is unclear.
- Thoughtful evaluation of the impact's significance to Maine is important.
- Careful development of any management plan is essential to support both industry and the environment.